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EXAMINER

KIM, CHONG R

ART UNIT	PAPER NUMBER
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2623

DATE MAILED: 07/23/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No. 09/473,003	Applicant(s) PATEL ET AL.	
Examiner Charles Kim	Art Unit 2623	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 May 2003.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 December 1999 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment and Arguments

1. Applicant's amendment filed on May 9, 2003 has been entered and made of record.
2. In view of applicant's amendment, the objection to claim 3 due to grammatical errors is withdrawn.
3. Applicant's arguments have been fully considered, but they are not deemed to be persuasive for at least the following reasons.

Applicants argue (page 8) that their claimed invention (claims 1, 8-9, 11-12) differs from the prior art because in Huang, "A user does not have an opportunity at the PACS display workstation to select the preprocessing functions applied to the raw image data." The Examiner disagrees. As noted in the previous office action (page 3), Huang teaches that the lookup tables containing the preprocessing functions can be inserted to the image header and sent to the PACS workstation, and "applied at the time of display to enhance the difference types of tissue" (page 223, section labeled "8.7.1.4 Lookup Table Generation"). Huang explains that the image is displayed on the PACS display workstation, therefore the preprocessing functions are be applied at the PACS display workstation. Huang further explains that the lookup tables allow the brightness and contrast of each region to be adjusted dependent on the application, wherein several lookup tables can be created to enhance the different parts of the image (page 223, section labeled "8.7.1.4 Lookup Table Generation"). Therefore, it appears that the PACS display workstation as taught by Huang, applies the lookup table (containing the preprocessing

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functions) during display, as noted above, and further selects a preprocessing function (brightness/contrast adjustment) based on the specific application required during display.

Applicants further argue (page 8) that “The PACS mentioned in Huang does not store raw image data”. The Examiner disagrees. The term *raw image data* is interpreted as “image data that has not yet been completely preprocessed”, as disclosed in lines 9-10 on page 4 of the applicant’s specification. As noted above, Huang explains that the preprocessing functions can be applied to the image data during display at the PACS display workstation. Therefore, the image data that is stored in the PACS database and sent to the PACS display workstation for further preprocessing is interpreted as “raw image data”, since the image data has not yet been completely preprocessed.

Applicants further argue (page 10) that their claimed invention (claims 1, 11, and 21) differs from the prior art because “Takeo does not relate to a PACS”, “Takeo does not teach or suggest storing raw image data in a PACS for later retrieval and preprocessing by a PACS display workstation”, and “Takeo does not teach preprocessing raw image data at the PACS display workstation by applying the preprocessing function to the raw image data”. The Examiner responds by pointing out the Takeo reference was not relied upon for these teachings. As noted in the previous office action (pages 5-7), Takeo teaches frequency and contrast preprocessing functions that are used in reproducing (displaying) the images. The Examiner notes that the limitations of claims 1, 11, and 21 are taught by Huang (as noted above), and not by Takeo.

Applicants further argue (page 11) that they disagree with the Official Notice supposedly taken by the Examiner in regards to the assertion that “frequency and contrast preprocessed raw

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image data was exceedingly well known in the art". The Examiner responds by pointing out that there was no indication in the previous office action that an Official Notice was taken. For example, the previous office action (page 5) states "However, frequency and contrast preprocessed raw image data was exceedingly well known in the art. For example, Takeo discloses a frequency and contrast preprocessed raw image data..." The Examiner notes that there was no Official Notice was taken. The Examiner further notes that the Takeo teaching was relied upon to support the statement that "frequency and contrast preprocessed raw image data was exceedingly well known in the art".

Applicants further argue (page 12) that they disagree with the Official Notice taken by the Examiner in regards to "applying frequency preprocessing to contrast preprocessed images". In response, the Examiner relies on Vuylsteke, U.S. Patent No. 5,644,662 to provide support for this assertion. Vuylsteke teaches the step of applying frequency preprocessing to contrast preprocessed images (col. 9, lines 35-39 and figure 3A). Note that "preprocessing" is interpreted to mean processing an image that will be further processed. In this case, Vuylsteke explains that the image is contrast preprocessed (CONTRAST ENHANCEMENT), and frequency preprocessing (HP EMPHASIS) is applied to the contrast preprocessed images.

Applicants further argue (page 12) that they disagree with the Official Notice taken by the Examiner in regards to the assertion that "storing image data created by workstations in databases was exceedingly well known in the art". In response, the Examiner relies on Wofford, U.S. Patent No. 5,542,003 to provide support for this assertion. Wofford teaches a PACS system (col. 2, lines 12-23), wherein the image data created by the workstation (PDS) is stored by the database (col. 6, lines 16-20). Wofford explains that the image is processed at the workstation,

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and the resultant image is stored in the database for future retrieval (col. 5, lines 45-49 and col. 6, lines 16-20).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 8-9, 11, 12, 19-21 are rejected under 35 U.S.C. 102(b) as being anticipated by the textbook entitled “PACS Basic Principles and Applications” by Huang (“Huang”).

Referring to claim 1, Huang discloses a method of processing raw image data at a PACS display workstation, the method comprising:

- a. retrieving from a PACS database, using a PACS workstation, raw image data delivered from an imaging modality [pages 177-179 and figure 8.14 on page 225. Note that the images from the imaging modality are sent to the PACS acquisition gateway for partial preprocessing (converting the data format to the PACS standard format), see section 7.1.1. The raw (partially preprocessed) images are then sent to the PACS database (controller), which “services archive retrieval requests from workstations” (TABLE 7.1)]
- b. selecting from a PACS database, using the PACS workstation, a first preprocessing function for the raw image data delivered from the imaging modality [section 8.7.1.4 on pages 222-223. Huang teaches that the PACS acquisition gateway generates brightness and contrast parameters (preprocessing functions) to form a lookup table for adjusting

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the brightness and contrast of the image (section 8.7.1.4). Huang further states that the lookup table containing the parameters (preprocessing functions) are inserted into the image header (section 8.7.1.4) and sent to the PACS database, allowing the workstations to retrieve the images from the database, as disclosed above. Note that the PACS database stores a plurality of images, where each image contains corresponding preprocessing functions. Therefore, the workstation inherently selects a preprocessing function when it retrieves an image from the PACS database.]

c. processing the raw image data at the PACS display workstation by applying the first preprocessing function to the raw image data to create a resultant image data [last sentence in section 8.7.1.4 on page 223. Huang teaches that the lookup tables (containing preprocessing functions) are applied at the time of display. Note that the preprocessing functions are applied at the workstation because the workstation displays the image, see section 7.1.3 on pages 179-180].

Referring to claim 8, Huang further discloses the step of applying an image processing function to the resultant image data to create processed resultant image data (section 12.3.1 on page 320).

Referring to claim 9, Huang further discloses displaying the processed resultant image data (section 12.3 on pages 320-327).

Referring to claim 11, see the rejection of at least claim 1 above. Huang further discloses that the PACS workstation comprises a processing circuit, a PACS network interface coupled to the processing circuit, and a software memory coupled to the processing circuit (section 7.1.3 on page 179).

Referring to claim 12, Huang further discloses that the raw image data corresponds to an anatomical (chest) region, and the preprocessing function is selected based on the anatomical region (second and third paragraph in section 8.7.1.4 on page 223).

Referring to claim 19, see the rejection of at least claim 8 above.

Referring to claim 20, see the rejection of at least claim 9 above.

Referring to claim 21, see the rejection of at least claim 11 above. Huang further discloses an image acquisition workstation (section 7.1.1 on page 177), and a PACS network interfaced to the image acquisition workstation (figure 8.1 on page 201).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 2-7, 10, 13-18, 22-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over the textbook entitled "PACS Basic Principles and Applications" by Huang ("Huang"), further in view of Takeo et al., U.S. Patent No. 6,231,246 ("Takeo").

Referring to claims 2 and 3, Huang fails to teach that the raw image data is frequency and contrast preprocessed raw image data.

However, frequency and contrast preprocessed raw image data was exceedingly well known in the art. For example, Takeo discloses a frequency and contrast preprocessed raw

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image data [col. 12, lines 18-34. Note that “preprocessing” an image is interpreted to mean processing an image that will be further processed. Therefore, processing the image under the “first displayed image processing conditions” is interpreted as frequency and contrast preprocessing because the image is processed to yield a desired level of gradation and a desired level of sharpness (lines 18-21), and then further processed under a “second displayed image processing means”].

Huang and Takeo are both concerned with performing image processing on medical images. Takeo’s method provides images that have good image quality and are easy to view (Takeo, col. 4, lines 58-60). Therefore, it would have been obvious to modify the raw image data of Huang so that it is frequency and contrast preprocessed raw image data, as taught by Takeo.

Referring to claim 4, see the discussion of claim 1. Huang discloses selecting a contrast preprocessing function (parameter).

Referring to claim 5, Huang and Takeo fail to teach the step of selecting a frequency preprocessing function. Official notice is taken that applying frequency preprocessing to contrast preprocessed images was exceedingly well known in the art. In response to the applicant’s traversal of the Official notice, the Examiner relies on Vuylsteke, U.S. Patent No. 5,644,662 to provide support for this assertion. Vuylsteke teaches the step of applying frequency preprocessing to contrast preprocessed images (col. 9, lines 35-39 and figure 3A). Note that “preprocessing” an image is interpreted to mean processing an image that will be further processed. In this case, Vuylsteke explains that the image is contrast preprocessed (CONTRAST

ENHANCEMENT), and frequency preprocessing (HP EMPHASIS) is applied to the contrast preprocessed images.

Therefore, it would have been obvious to modify the selecting step of Huang and Takeo so that a frequency preprocessing function is selected. One would have been motivated to select a frequency preprocessing function in order to yield a visible image having a desired level of sharpness on the display device (Takeo, col. 12, lines 19-21).

Referring to claim 6, Huang fails to teach that the contrast preprocessing function is characterized by at least one of a GT, GA, GC, and GS preprocessing parameters.

Takeo teaches contrast preprocessing functions characterized by at least one of a GT, GA, GC, and GS preprocessing parameters (col. 12, lines 18-60 and TABLE 7).

Huang and Takeo are both concerned with performing image processing on medical images. Takeo's method provides images that have good image quality and are easy to view (Takeo, col. 4, lines 58-60). Therefore, it would have been obvious to modify the contrast preprocessing function of Huang so that it is characterized by at least one of a GT, GA, GC, and GS preprocessing parameters, as taught by Takeo.

Referring to claim 7, Huang fails to teach that the frequency preprocessing function is characterized by at least one of a RN, RE, and RT preprocessing parameters.

Takeo teaches frequency preprocessing functions characterized by at least one of a RN, RE, and RT preprocessing parameters (col. 12, lines 18-60 and TABLE 7).

Huang and Takeo are both concerned with performing image processing on medical images. Takeo's method provides images that have good image quality and are easy to view (Takeo, col. 4, lines 58-60). Therefore, it would have been obvious to modify the frequency

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preprocessing function of Huang so that it is characterized by at least one of a RN, RE, and RT preprocessing parameters, as taught by Takeo.

Referring to claim 10, Huang fails to explicitly state that the resultant image data created by the workstation is stored in the PACS database for future retrieval. Official notice is taken that storing image data created by workstations in databases was exceedingly well known in the art. In response to the applicant's traversal of the Official notice, the Examiner relies on Wofford, U.S. Patent No. 5,542,003 to provide support for this assertion. Wofford teaches a PACS system (col. 2, lines 12-23), wherein the image data created by the workstation (PDS) is stored by the database (col. 6, lines 16-20). Wofford explains that the image is processed at the workstation, and the resultant image is stored in the database for future retrieval (col. 5, lines 45-49 and col. 6, lines 16-20).

Note that Huang teaches updating the database (Table 7.1). Huang further states that the database archives the images (studies) (Table 7.1). Therefore, it would have been obvious to store the resultant image data in the PACS database in order to keep the database updated, and allow other workstations access to the archived image data for diagnostic purposes.

Referring to claims 13 and 14, see the rejections of at least claims 2 and 3 above.

Referring to claims 15 and 22, see the rejection of at least claim 4 above.

Referring to claims 16 and 24, see the rejection of at least claim 5 above.

Referring to claims 17 and 23, see the rejection of at least claim 6 above.

Referring to claims 18 and 25, see the rejection of at least claim 7 above.

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Charles Kim whose telephone number is 703-306-4038. The examiner can normally be reached on Monday thru Thursday 8:30am to 6:00pm and alternating Fridays 9:30am to 6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au can be reached on 703-308-6604. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9314 for regular communications and 703-872-9314 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-306-0377.

ck

ck

July 21, 2003

Jon Chang
Jon Chang
Primary Examiner